Series[Sin[x],{x,0,10}]

Input interpretation:

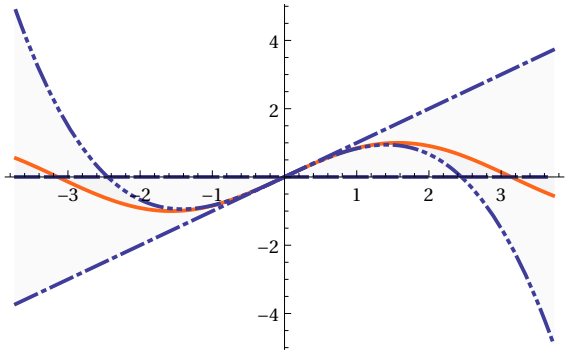
series	$\sin(x)$	point	$x = 0$
		order	x^{10}

Series expansion at x=0: More terms

$$x - \frac{x^3}{6} + \frac{x^5}{120} - \frac{x^7}{5040} + \frac{x^9}{362\,880} - \frac{x^{11}}{39\,916\,800} + O\left(x^{12}\right)$$

(Taylor series)

Approximations about x=0 up to order 3: More terms



(order n approximation shown with n dots)

Series representations:

More

$$\sin(x) = \sum_{k=0}^{\infty} \frac{(-1)^k\, x^{1+2\,k}}{(1+2\,k)!}$$

$$\sin(x) \propto \frac{\sum_{k=0}^{\infty} (-1)^k \frac{\partial^{2\,k}\delta(x)}{\partial x^{2\,k}}}{\theta(x)}$$

$$\sin(x) = 2\sum_{k=0}^{\infty} (-1)^k\, J_{1+2\,k}(x)$$

$$\sin(x) = \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{\pi}{2}+x\right)^{2\,k}}{(2\,k)!}$$

$n!$ is the factorial function »

$\theta(x)$ is the Heaviside step function »

$\delta(x)$ is the Dirac delta function »

$J_n(z)$ is the Bessel function of the first kind »

More information »